

SECTION H: SAFETY

Safety

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Personal Protective Equipment

Too many workers think personal protective equipment is a nuisance. They think it gets in the way, is inconvenient, is uncomfortable, and that it is not necessary anyway. There are even some workers who worry about how they will look if they wear safety goggles or ear plugs.

There are limits to how much protection you can get from personal protective equipment. It stands to reason that safety equipment is useless if you leave it hanging in a closet or take it off while you still need it. Even if you use protective equipment, and wear it when you need it, it cannot work magic. You still must use common sense and work safely.

Protective equipment does not give you super powers. Use it within the limits of the warning label, because that is when it safeguards you.

About one in ten disabling injuries to workers is to the feet and toes. These injuries can be reduced, or eliminated, by wearing safety shoes. Strap-on metal leg guards will protect your insteps, shins, and lower legs.

Work Site Protection

Traffic must be warned of your presence when near a street. “WORKERS AHEAD” and CAUTION, CONSTRUCTION WORK” signs are effective. Signs with flags or flashers and vehicles with rotating flashing lights are used to warn other motorists. Use flaggers to alert drivers and to direct traffic around the work site. Warning signs and flaggers must be located far enough in advance of the work area to allow motorists time to realize they must slow down, be alert for activity, and safely change lanes or follow a detour. Exact distances and nature of advance warning depend on traffic speed, congestion, roadway conditions, and local regulations.

EXCAVATING AND TRENCHING

Cave-ins are Killers

Trench and excavation cave-ins account for a growing number of fatalities and serious injuries in construction. In 1972 alone, more than 100 workers were suffocated or crushed in such cave-ins. Too many contractors and the workers they employ fail to realize the hazard of working in unprotected or poorly protected excavations. With little or no warning, an unsupported, improperly shored or sloped trench or excavation wall can collapse, trapping the workers below in seconds.

Inadequate shoring in an attempt to cut costs or save time, misjudgment of soil conditions, defective shoring materials, failure to evaluate changing weather conditions or heavy loads in the area—these are among the common causes of trench and excavation cave-ins.

According to the OSHA construction safety and health standards, a trench is referred to as a narrow excavation in which the depth is greater than the width. Although, the width is not greater than 15 feet. An excavation is any man-made cavity or depression in the earth's surface. This can include excavations for anything from cellars to highways.

OSHA requires that all excavations over five feet deep be sloped, shored, or otherwise supported. When soil conditions are unstable, excavations shallower than five feet also must be sloped, supported, or shored.

Causes of Cave-Ins

- Failure to shore, possibly because of a deliberate short-cut to save time or expense.
- Inadequate shoring because of lack of knowledge or misjudgment of soil stability.
- Failure of shoring because of unsuspected bank loading caused by traffic or machinery vibration.
- Inadequate shoring maintenance or replacement after changes occur in the soils surrounding an excavation as a result of construction work or heavy rains.
- Failure of shoring material.
- Placement of spoil too near the trench edge.
- Trench wall undercutting.

Preventing Cave-Ins

One method of ensuring the safety and health of workers in a trench or excavation is to slope the sides of the cut to the “angle of repose.” This is the angle closest to the perpendicular at which the soil will remain at rest. The angle of repose varies with different kinds of soil and must be determined on each individual project. When an excavation has water conditions, silty material, or loose boulders, or when it is being dug in areas where erosion, deep frost, or slide planes are apparent, the angle of repose must be flattened.

A second method of support is shoring-sheeting. This method involves tightly-placed timber shores, bracing, trench jacks, piles, or other materials installed in a manner strong enough to resist the pressures surrounding the excavation.

Contractors also may use a trench box, a prefabricated moveable trench shield composed of steel plates welded to a heavy steel frame. OSHA standards permit the use of trench box as long as the protection it provides is equal to or greater than the protection that would be provided by the appropriate shoring system.

Biological Hazards

Infection and Infectious Diseases

Although workers are certainly not expected to stay clean at all times, practicing personal cleanliness greatly reduces the risk of infections and infectious diseases. Both water and wastewater may expose workers to biological hazards.

The on-site installer has occasional exposure to these hazards.

Although most studies of routine exposures to wastewater reveal only slight risk of disease, a number of studies continue to show some evidence of the risk of infections. These reports usually stem from investigations prompted by apparent outbreaks of disease among wastewater workers. The finding of increased rates of gastrointestinal illness among inexperienced workers points to the importance of efforts to minimize contact with wastewater and to continue to promote basic hygienic principles.

Basic Hygiene Principles

For the sake of your health and the health of your family, when working around wastewater or septage:

- Never eat your lunch or put anything into your mouth without first washing your hands.
- Always wear your rubber boots when working in tanks, sewer lines, or septage.
- Always wear rubber or plastic coated gloves when cleaning out pumps, handling hoses, or when working around wastewater.
- Do not wash work clothes with the family wash.

Summary

Wastewater and water workers are exposed to many disease-producing microorganisms. Microorganisms are routinely discharged in sewers from hospitals and throughout the community from persons with illnesses. Although most studies indicate that infections with specific agents are not common, wastewater-exposed workers, especially during their first few years of employment, experience increased rates of gastrointestinal illness. These are generally thought to be related to biological exposures. Two studies indicated a risk of hepatitis A among sewer workers and those involved in primary sludge

treatment. Recent studies have shown sewer workers to be at increased risk for parasitic infection but improved work practices seem to reduce the risk. Appropriate work practices including using facilities for daily showers and separating clothing used on the job and after work are essential. Use of personal protective equipment and practices recommended for health care workers to prevent infection from the virus causing AIDS (HIV) is advised. As much as feasible, it is also advised for those exposed to wastewater, such as in and near hospitals.

Confined Space Safety

The deaths of workers in confined spaces constitute a recurring occupational tragedy. Approximately 60% of these fatalities have involved would-be rescuers. If you are required to work in a:

- Sewer
- Septic tank
- Pumping/lift station
- Pit

or similar type of structure or enclosure, you are working in a CONFINED SPACE.

Causes of Fatalities

Based on the information derived from these case studies, NIOSH concluded that these fatalities occurred as a result of encountering one or more of the following potential hazards:

- lack of natural ventilation
- oxygen-deficient atmosphere
- flammable/explosive atmosphere
- unexpected release of hazardous energy
- limited entry and exit
- dangerous concentrations of air contaminants
- physical barriers or limitations to movement
- instability of stored product

Confined Space Identification

A confined space is a space which has all of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Limited openings for entry and exit.
- Not designed for continuous worker occupancy.

Confined Space Hazards

As mentioned, the atmosphere in a confined space may be extremely hazardous because of the lack of natural air movement.

- Oxygen-deficient atmospheres.
- Flammable atmospheres.
- Toxic atmospheres.

Symptoms of Asphyxiation Include:

- Headache
- Dizziness
- Drowsiness
- Nausea

Prolonged exposure can cause convulsions and death. **Never trust your senses to determine if the air in a confined space is safe! You can NOT see or smell many toxic gases and vapors, nor can you determine the level of oxygen present.**

- Methane (CH_4)
- Carbon dioxide (CO_2)
- Hydrogen sulfide (H_2S)

Working in a Confined Space...

Keep alert! At the first sign of trouble—dizziness, difficulty breathing, anything—leave immediately or call for help. Report the problem to your supervisor.

Never enter a confined space without a buddy waiting outside to help you. He should have the same type of protective gear you have. Your buddy should also:

- Have a lifeline or parachute harness attached to you which he could use to pull you out if necessary.
- Have you signal him periodically so he knows you're okay.
- Remain outside at all times. A third person should be within hailing distance to help if necessary.

Rescue Attempts

Over 50% of the workers who die in confined spaces are attempting to rescue other workers. Rescuers must be trained in and follow established emergency procedures. They must use appropriate equipment and techniques (lifelines, respiratory protection, standby persons, etc.). Unplanned rescues, such as when someone instinctively rushes in to help a downed co-worker, can easily result in

a double fatality. They could even result in multiple fatalities if there is more than one would-be rescuer.

REMEMBER: AN UNPLANNED RESCUE WILL PROBABLY BE YOUR LAST.

Electrical Safety

Typically most people would expect electrical work to be performed by a competent, licensed electrician. However, there is a lot of leeway as to when a contractor must employ a licensed electrician to do electrical installation work. For example, Iowa does not mandate the use of licensed electricians on a statewide basis. The only specific requirements are those enforced by municipalities, as part of their city's ordinances. City ordinances vary between municipalities. Thus, any contractor that is working within the city limits of a municipality must be aware of and follow that city's requirements.

Anyone who allows untrained and unqualified persons to install electrical components on a project is creating a significant legal risk for himself or herself. In the event that there is an injury causing accident, explosion, fire, etc., the installer will be liable for damages. Legal judgments may be even higher if the installer did not use reasonable and prudent care when installing the system. Typically, the use of untrained, unqualified persons to install electrical wiring and equipment would not be viewed as reasonable and prudent care. Therefore, it is recommended that installers always utilize competent, licensed electricians who are knowledgeable of the National Electrical Code for all of the electrical installation work associated with OSSF systems.